

# VVV 2013 Task: Structure From Motion (SFM) + Demos?

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# Problem Formulation

**Stereo-based Depth Images**



**Light Coding Depth Images**



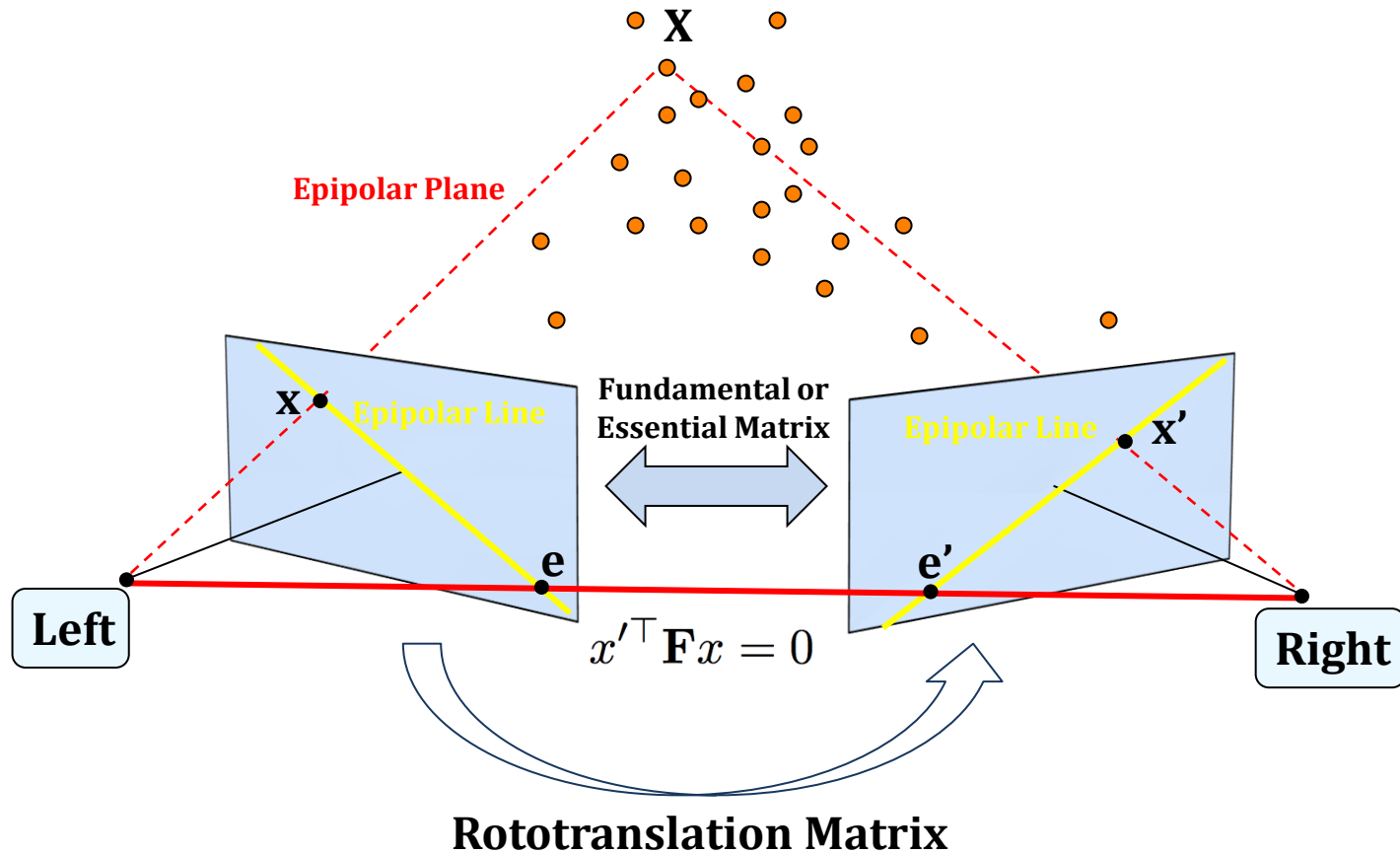
We want to see like Kinect without Kinect!

## Problem:

The kinematics of the iCub does not retrieve a perfect camera position estimation

Real-Time camera position estimation is needed

# Problem Formulation



Design and implementation of camera relative position in real-time for a robust 3D Map estimation.

## Subtasks:

- Feature Extraction in GPU ✓
- Feature Matching in GPU ✓
- Epipolar Geometry Computation with Fundamental Matrix and outliers rejection scheme ✓
- From Fundamental to Essential Matrix ✓
- Essential Matrix Projection into a correct space (Thx Francesco N. for the tip!) ✓
- Essential Decomposition in 4 Rototranslation Matrices ✓
- Chierality Test for correct model ✓
- Model validation with Kinematics prior ✓
- Bundle Adjustment of 3D Points and Cameras ✗

Feature Matching

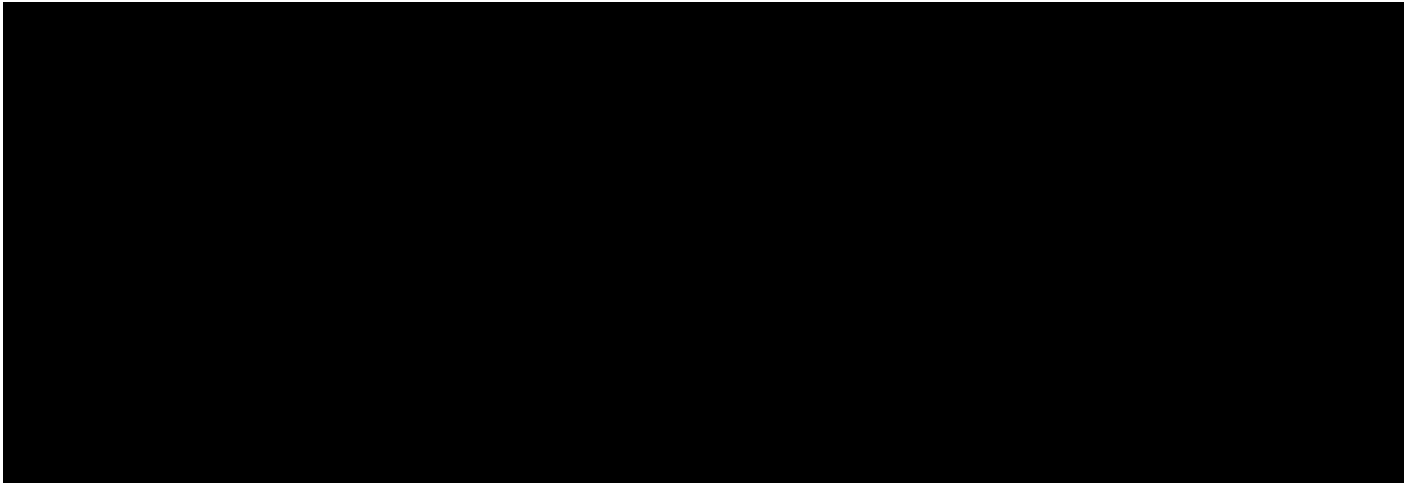


Depth Estimation



# Some Results... (videos)

Feature Matching



Depth Estimation

